

N- and P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

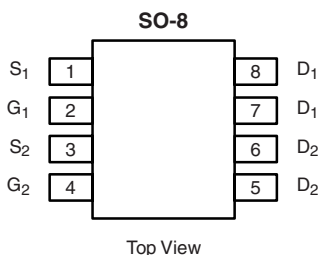
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.025 at V _{GS} = 10 V	6.9
		0.035 at V _{GS} = 4.5 V	5.8
P-Channel	- 30	0.032 at V _{GS} = - 10 V	- 6.1
		0.045 at V _{GS} = - 4.5 V	- 5.1

FEATURES

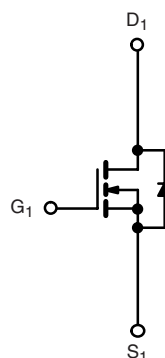
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



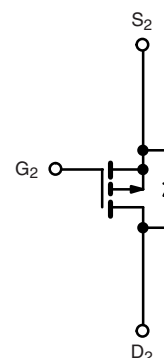
RoHS
COMPLIANT
HALOGEN
FREE
Available



Ordering Information: Si4542DY-T1-E3 (Lead (Pb)-free)
Si4542DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted					
Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	- 30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	6.9	- 6.1	A
	$T_A = 70\text{ }^{\circ}\text{C}$		5.5	- 4.9	
Pulsed Drain Current		I_{DM}	40	- 40	
Continuous Source Current (Diode Conduction) ^a		I_S	1.7	- 1.7	
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2.0		W
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	N- or P-Channel	Unit
Maximum Junction-to-Ambient ^a	R _{thJA}	62.5	°C/W

Notes:

a. Surface Mounted on FR4 board, t ≤ 10 s.

SPECIFICATIONS T _J = 25 °C, unless otherwise noted							
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Static							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1.0			V
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1.0			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	N-Ch P-Ch			± 100 ± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = - 30 V, V _{GS} = 0 V	P-Ch			- 1	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			25	
		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			- 25	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	N-Ch	20			A
		V _{DS} ≤ - 5 V, V _{GS} = - 10 V	P-Ch	- 20			
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 6.9 A	N-Ch		0.020	0.025	Ω
		V _{GS} = - 10 V, I _D = - 6.1 A	P-Ch		0.026	0.032	
		V _{GS} = 4.5 V, I _D = 5.8 A	N-Ch		0.026	0.035	
		V _{GS} = - 4.5 V, I _D = - 5.1 A	P-Ch		0.036	0.045	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 6.9 A	N-Ch		25		S
		V _{DS} = - 15 V, I _D = - 6.1 A	P-Ch		16		
Diode Forward Voltage ^a	V _{SD}	I _S = 1.7 A, V _{GS} = 0 V	N-Ch			1.2	V
		I _S = - 1.7 A, V _{GS} = 0 V	P-Ch			- 1.2	
Dynamic ^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 6.9 A	N-Ch P-Ch		30 32	50 50	nC
Gate-Source Charge	Q _{gs}		N-Ch P-Ch		7.5 7.0		
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 6.1 A	N-Ch P-Ch		3.5 5.0		
Gate Resistance	R _g		N-Ch P-Ch	0.5 2	2 4	3.4 6.8	Ω
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	N-Ch P-Ch		12 10	20 20	ns
Rise Time	t _r		N-Ch P-Ch		10 10	20 20	
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = - 15 V, R _L = 10 Ω I _D ≅ - 1 A, V _{GEN} = - 10 V, R _g = 6 Ω	N-Ch P-Ch		60 55	90 80	
Fall Time	t _f		N-Ch P-Ch		15 25	30 40	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.7 A, dI/dt = 100 A/μs	N-Ch		50	90	
		I _F = - 1.7 A, dI/dt = 100 A/μs	P-Ch		50	90	
Reverse Recovery Time	Q _{rr}	I _F = 1.7 A, dI/dt = 100 A/μs	N-Ch		45		nC
		I _F = - 1.7 A, dI/dt = 100 A/μs	P-Ch		55		

Notes:

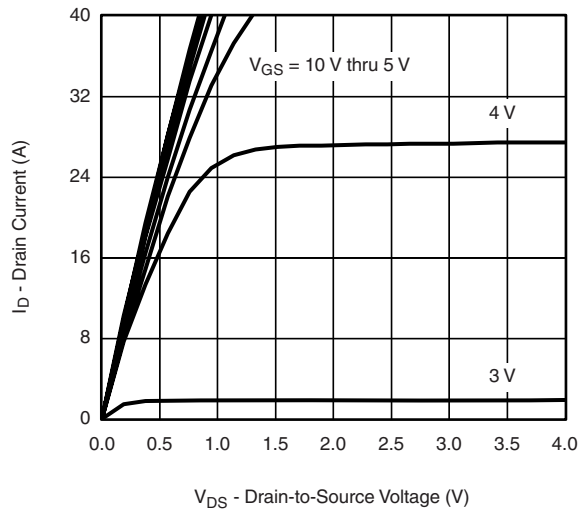
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

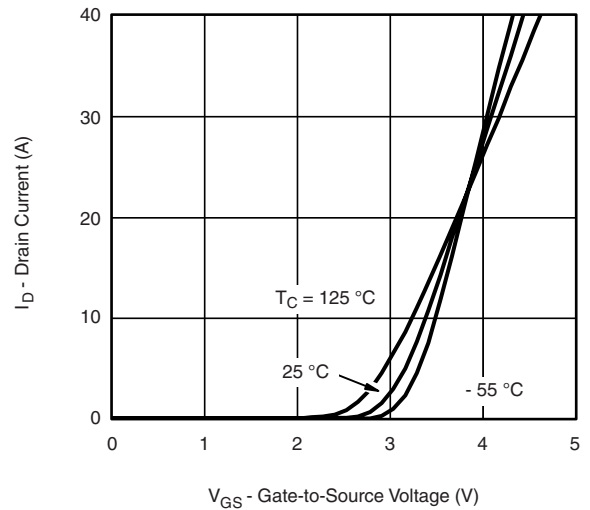
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



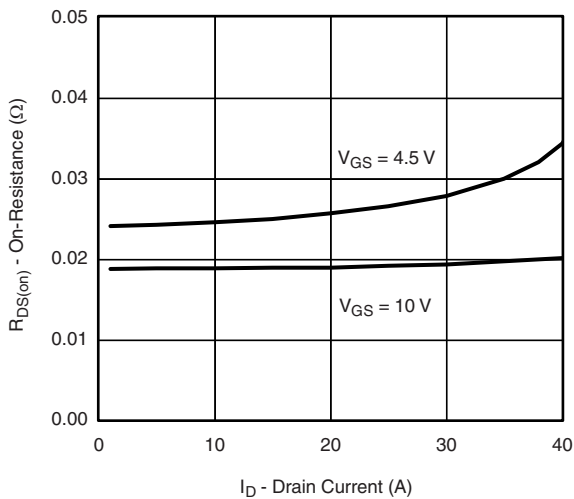
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



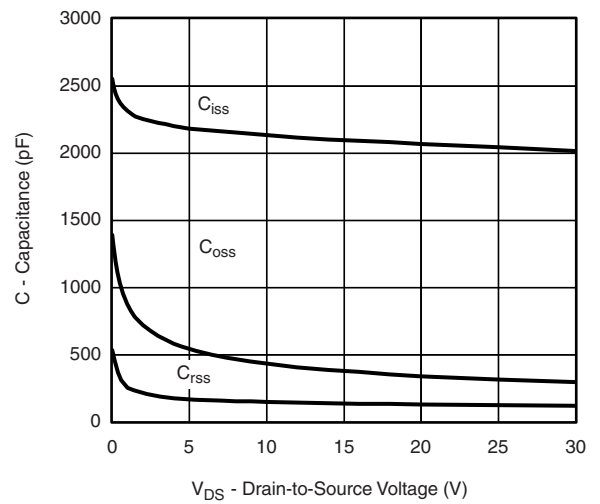
Output Characteristics



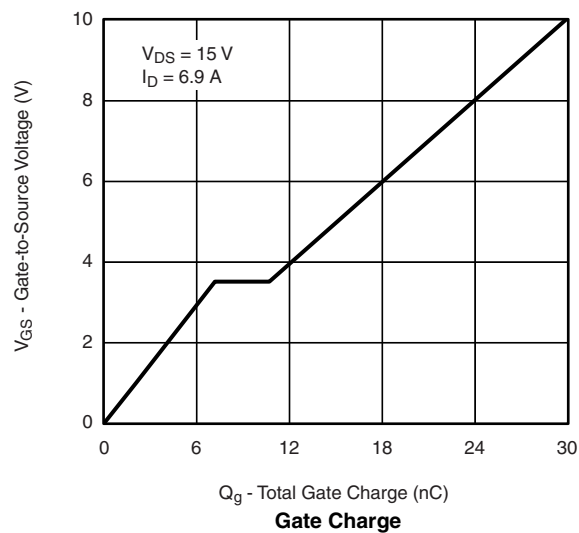
Transfer Characteristics



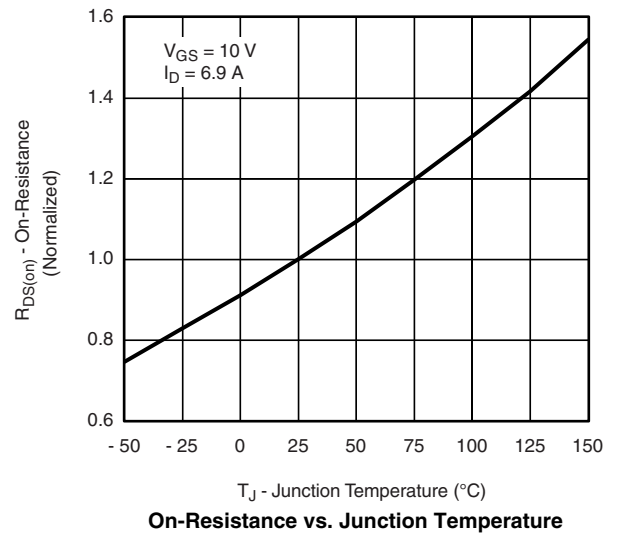
On-Resistance vs. Drain Current



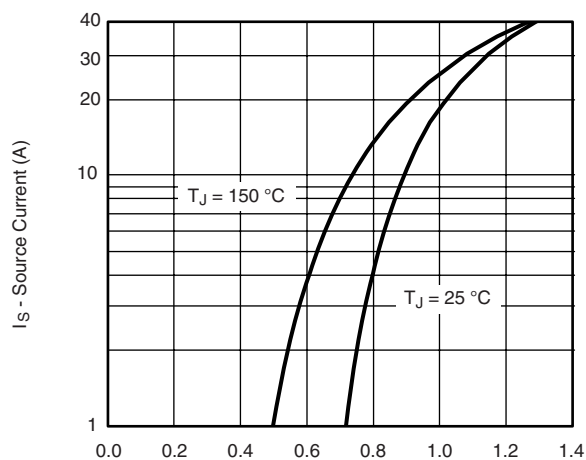
Capacitance



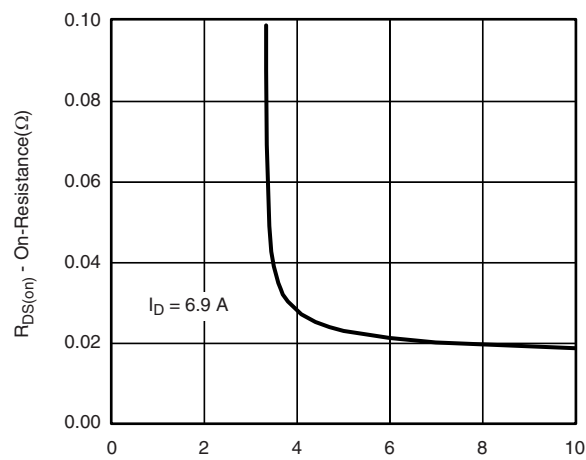
Gate Charge



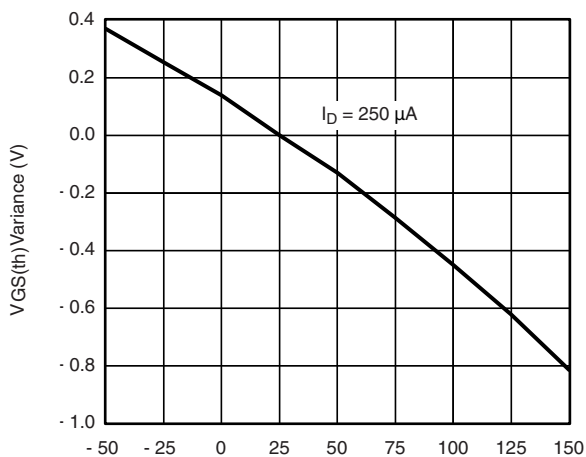
On-Resistance vs. Junction Temperature

N-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted

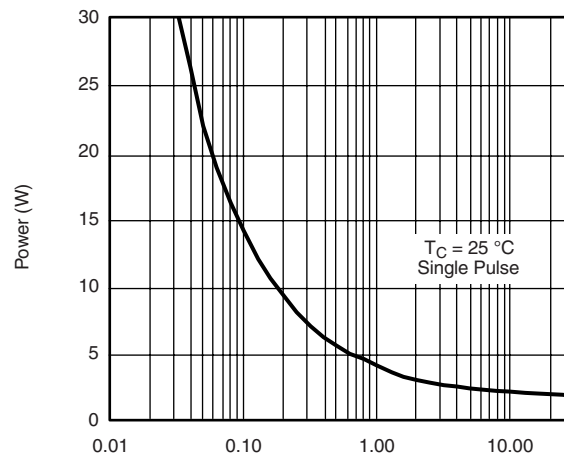
Source-Drain Diode Forward Voltage



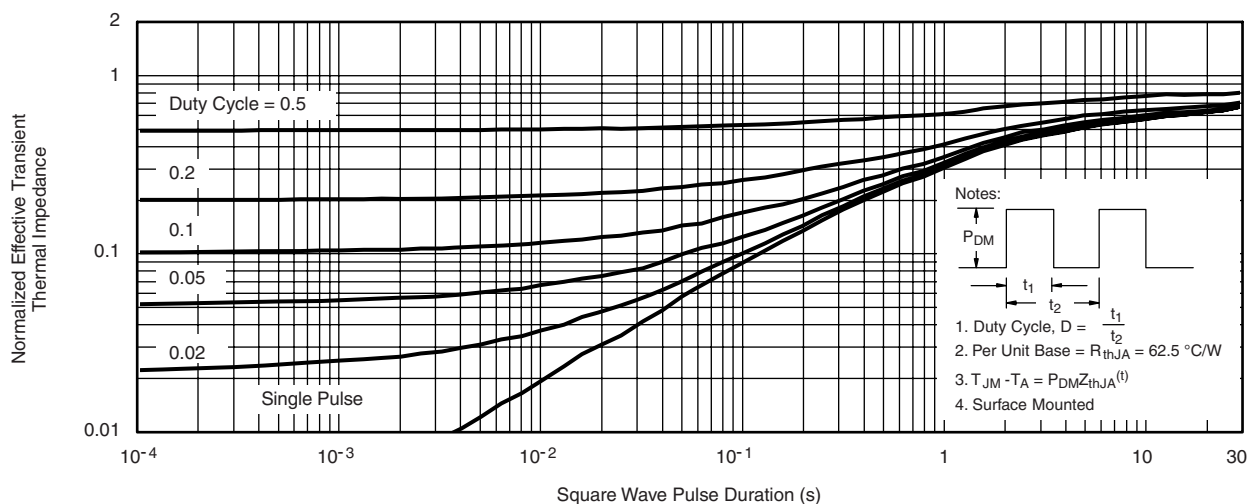
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

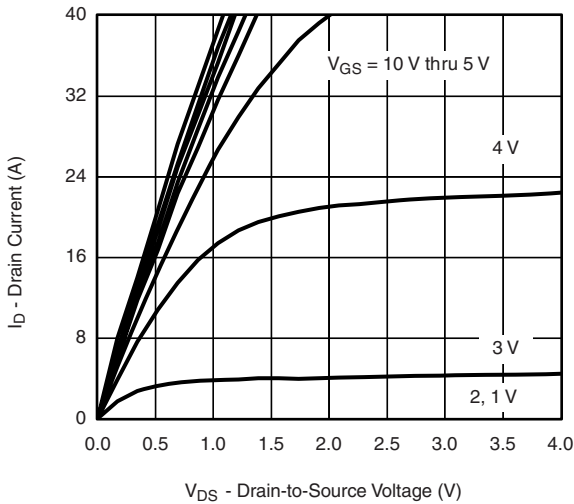


Single Pulse Power

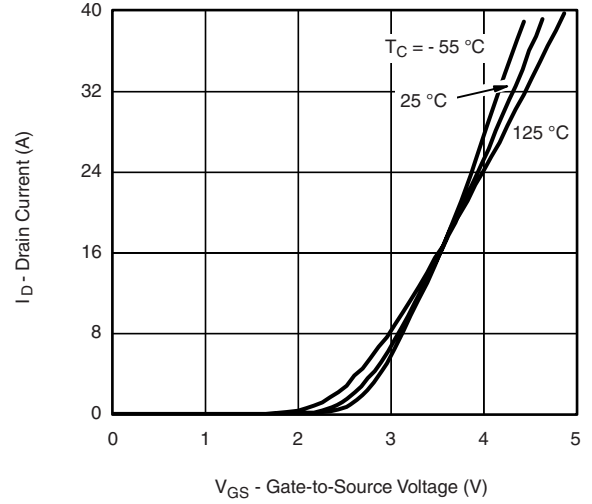


Normalized Thermal Transient Impedance, Junction-to-Ambient

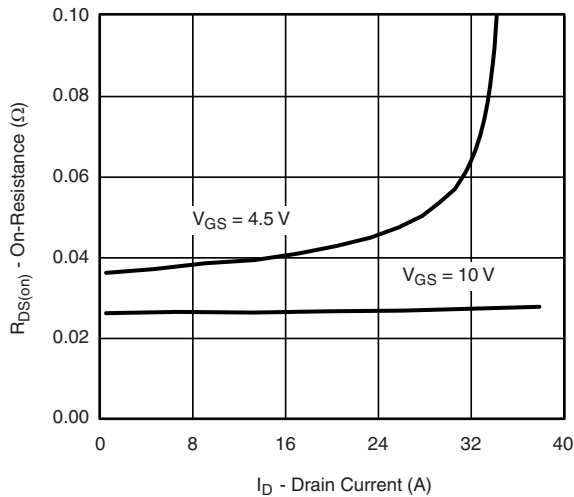
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



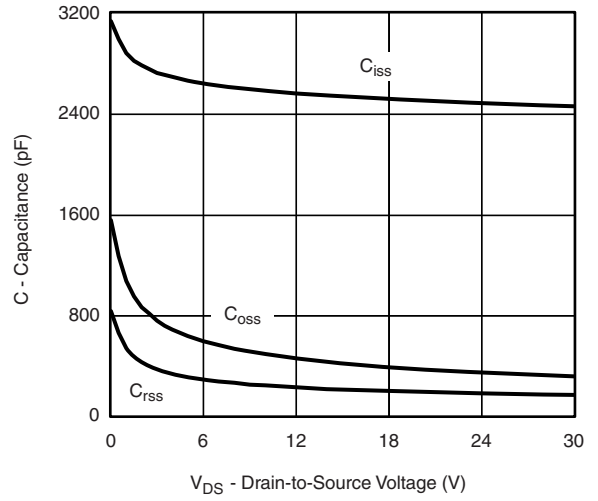
Output Characteristics



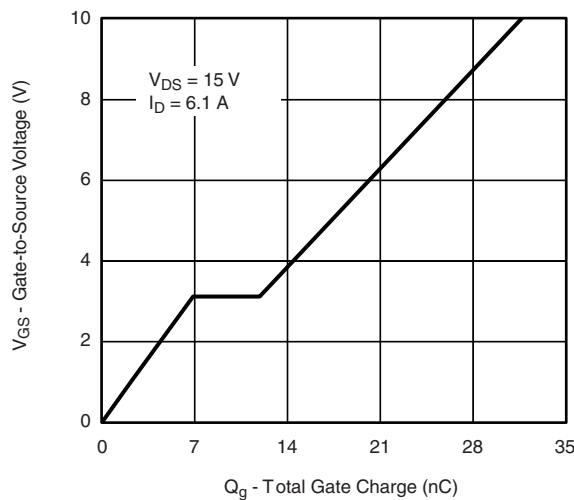
Transfer Characteristics



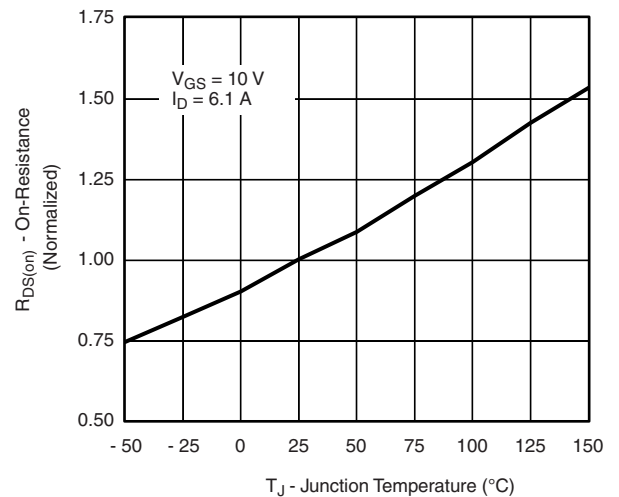
On-Resistance vs. Drain Current



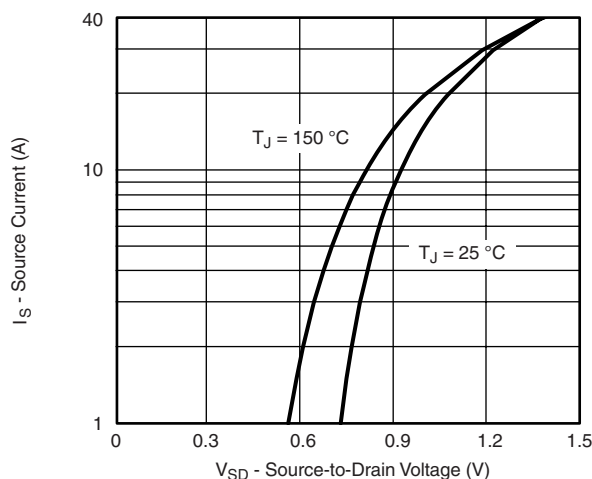
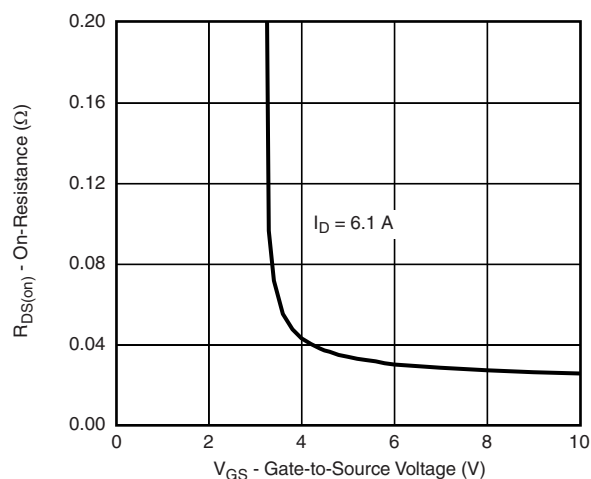
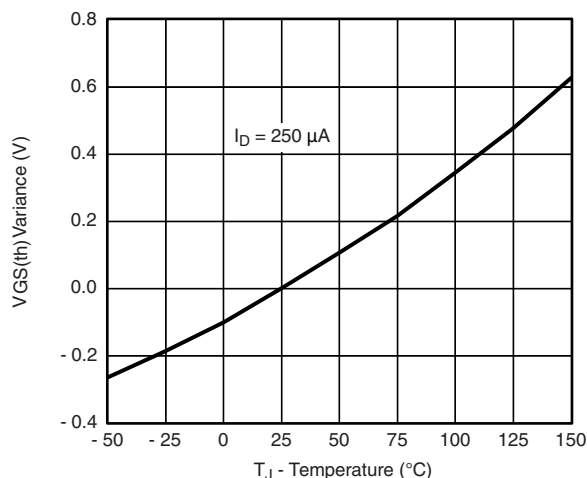
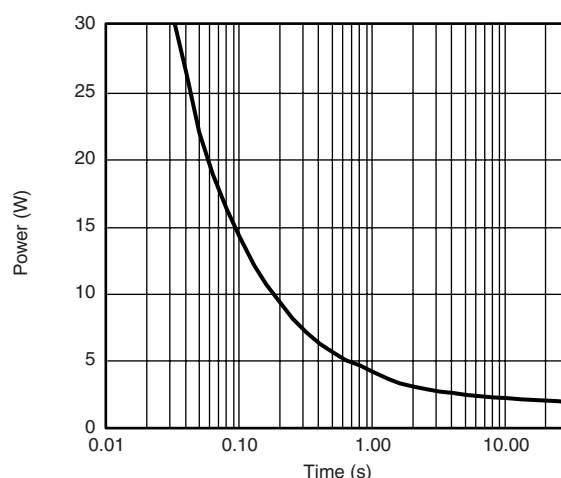
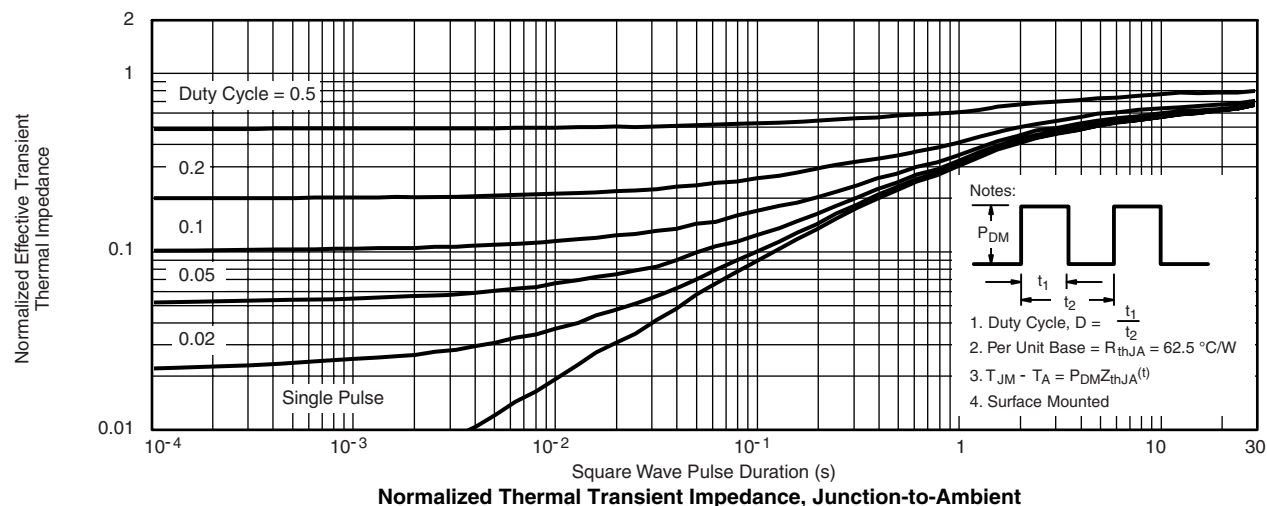
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

P-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power****Normalized Thermal Transient Impedance, Junction-to-Ambient**

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